Conel

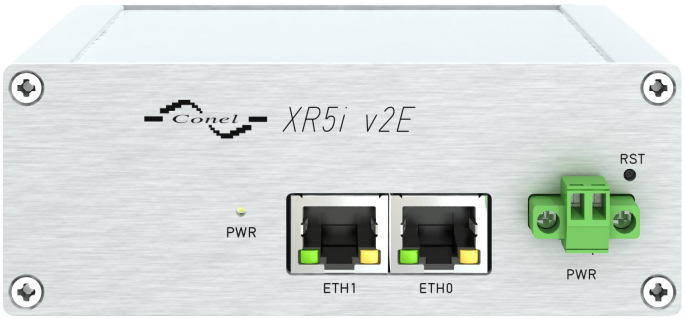
A B&B ELECTRONICS Company

LUCOM

The connecting & monitoring company

Industrial router **XR5i v2E**

USER'S MANUAL



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Used symbols

Danger – important notice, which may have an influence on the user's safety or the function of the device.

Attention – notice on possible problems, which can arise in specific cases.

Information, notice – information, which contains useful advice or special interest.

GPL license

Source codes under GPL license are available free of charge by sending an email to:

info@conel.cz.

Conel s.r.o., Sokolska 71, 562 04 Usti nad Orlici, Czech Republic
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Contents

1 Safety instruction **1**

2 Product disposal instructions **2**

3 Router description **3**

4 Contents of package **4**

5 Router design **5**

5.1 Router versions . . . 5
5.2 Delivery identification . . . 6
5.3 Ordering codes . . . 6
5.4 Basic dimensions of plastic box . . . 7
5.5 Basic dimensions of metal box . . . 7
5.6 Mechanical dimensions and mounting recommendations . . . 8
5.7 Removing from the DIN rail . . . 10
5.8 Description of the front panel . . . 11
5.8.1 Status indication . . . 11
5.8.2 Power connector PWR . . . 12
5.8.3 Ethernet port (ETH0 and ETH1) . . . 13
5.8.4 Reset . . . 15

6 First use **16**

6.1 Connecting the router before first use . . . 16
6.2 Start . . . 17
6.3 Configuration . . . 17
6.3.1 Configuration over web browser . . . 17
6.3.2 Configuration over Telnet . . . 17

7 Technical parameters **18**

7.1 Technical parameters of router . . . 18
7.2 Technical parameters of processor . . . 18

8 Recommended literature **19**

9 Possible problems **20**

10 FAQ **21**

11 Customers support **23**

19-06-15

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List of Figures

1 Contents of package 4
2 Front panel XR5i v2E 5
3 Front panel XR5i v2E WIFI 5
4 Front panel XR5i v2E SL 5
5 Front panel XR5i v2E WIFI SL 5
6 Example of label 6
7 Basic dimensions of plastic box 7
8 Basic dimensions of metal box 7
9 Cable routing 8
10 Cable routing for SL version 8
11 Space in front of connectors 9
12 Space in front of connectors – SL 9
13 Default position of DIN holder 10
14 Removing from the DIN rail 10
15 Front panel XR5i v2E WIFI SL 11
16 Power connector 12
17 Connection of power supply connector 12
18 Connection of power supply 12
19 Ethernet connector 13
20 Connection of ethernet cable 13
21 Example of router connection 14
22 Router reset 15
23 Router connection 16

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List of Tables

1 Router versions 5
2 Delivery identification 6
3 Front panel description 11
4 Router status indication 11
5 Connection of power connector 12
6 Connection of Ethernet connector 13
7 Description of reset and restart router 15
8 Technical parameters of router 18
9 Technical parameters of processor 18

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1. Safety instruction

Please, observe the following instructions:

- The router must be used in compliance with all applicable international and national laws and in compliance with any special restrictions regulating the utilization of the router in prescribed applications and environments.
- To prevent possible injury to health and damage to appliances and to ensure that all the relevant provisions have been complied with, use only the original accessories. Unauthorised modifications or utilization of accessories that have not been approved may result in damage to the router and in a breach of applicable regulations. Unauthorized modifications or utilization of accessories that have not been approved may result in the termination of the validity of the guarantee.
- The router can not be opened.
- Before handling of the SIM card turn off the router and disconnect it from power supply.
- **Caution!** The SIM card could be swallowed by small children.
- It must not be exceeded by the maximum voltage 30 V DC power connector on the router.
- Do not expose the router to extreme ambient conditions. Protect the router against dust, moisture and high temperature.
- The router should not be used at petrol stations of flammable and explosive materials. We remind the users of the duty to observe the restrictions concerning the utilization of radio devices at petrol stations, in chemical plants, or in the course of blasting works in which explosives are used.
- Switch off the router when travelling by plane. Utilization of the router in a plane may endanger the operation of the plane or interfere with the mobile telephone network, and may be unlawful. Failure to observe these instructions may result in the suspension or cancellation of telephone services for the respective client, or, it may result in legal sanctions; it may also result in both eventualities.
- When using the router in the close proximity of personal medical devices, such as cardiac pacemakers or hearing aids, you must proceed with heightened caution.
- If it is in the proximity of TV sets, radio receivers and personal computers, the telephone may cause interference.
- It is recommended that you should create an appropriate copy or backup of all the important settings that are stored in the memory of the device.

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2. Product disposal instructions

The WEEE (Waste Electrical and Electronic Equipment: 2002/96/EC) directive has been introduced to ensure that electrical/electronic products are recycled using the best available recovery techniques to minimize the impact on the environment. This product contains high quality materials and components which can be recycled. At the end of it's life this product MUST NOT be mixed with other commercial waste for disposal. Check the terms and conditions of your supplier for disposal information.

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3. Router description

Industrial router XR5i v2E is used to a secure connection between two local area networks (LANs) via two ETHERNET interfaces 10/100 and secured tunnel (IPSec, OpenVPN or L2TP). This router is supplied either in a plastic or metal casing, based on the requirements of the customer.

Configuration is performed via web interface and protected by password. The router supports creation of VPN tunnels using technologies IPsec, OpenVPN and L2TP to ensure safe communication. Web interface provides detail statistics about the router activities.

Other diagnostic functions ensuring continuous communication include automatic functionality inspection, or hardware Watchdog which monitors the status of the router. With the help of a special window (start up script window) you may insert Linux scripts for various actions. For some applications the key option to create several different configurations for one wireless router, the so-called profiles (maximum of 4), and the option to switch between them (for example via binary input status, web interface, etc.) is essential.

The industrial router XR5i v2E has implemented SNMP protocol for remote management. It is also possible to configure the network in bulk and use any additional software – VPN SmartCluster configurator to easily configure a VPN or a program for monitoring routers in the network R-SeeNet. Industrial XR5i v2E router is enhanced by the ability to create custom functions easy integration of custom software modules.

Examples of possible applications

- security system
- monitoring
- vending and dispatcher machines

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4. Contents of package

Basic delivered set of router includes:

- router,
- power supply,
- 2x crossover UTP cable,
- clip for the DIN rail,
- installation CD containing instructions,
- paper start guide.

Figure 1: Contents of package

Note: The router box and DIN mount are supplied in a metal case in the SL version.

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5. Router design

5.1 Router versions

XR5i v2E router is supplied in the following versions:

	Box	ETH0	ETH1
XR5i v2E	Plastic	✓	✓
XR5i v2E SL	Metal	✓	✓
XR5i v2E WIFI	Plastic	✓	✓
XR5i v2E WIFI SL	Metal	✓	✓

Table 1: Router versions

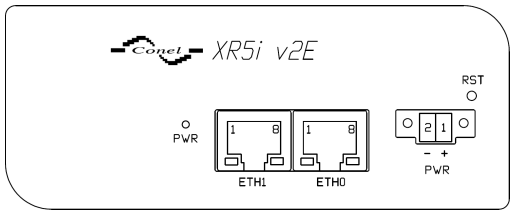

Figure 2: Front panel XR5i v2E

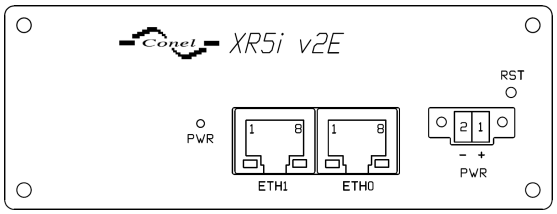

Figure 4: Front panel XR5i v2E SL

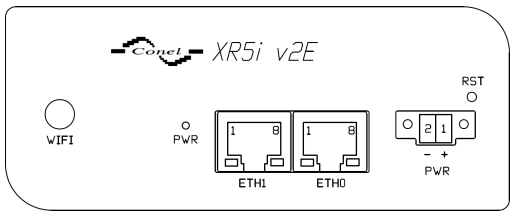

Figure 3: Front panel XR5i v2E WIFI

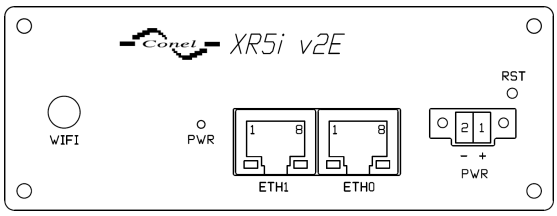

Figure 5: Front panel XR5i v2E WIFI SL

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5.2 Delivery identification

Trade name	Type name	Other
XR5i v2E	XR-5i-v2E	Version in plastic box
XR5i v2E SL	XR-5i-v2E	Version in metal box
XR5i v2E WIFI	XR-5i-v2E	Version with WIFI module in plastic box
XR5i v2E WIFI SL	XR-5i-v2E	Version with WIFI module in metal box

Table 2: Delivery identification

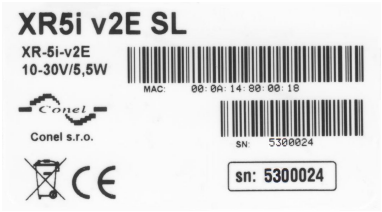

Figure 6: Example of label

5.3 Ordering codes

For this products are the following ordering codes:

- **XR5i v2E set**
  includes 2x Ethernet, supplied in plastic box
- **XR5i v2E SL set**
  includes 2x Ethernet, supplied in metal box
- **XR5i v2E WIFI set**
  includes 2x Ethernet and 1x WIFI, supplied in plastic box
- **XR5i v2E WIFI SL set**
  includes 2x Ethernet and 1x WIFI, supplied in metal box

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5.4 Basic dimensions of plastic box

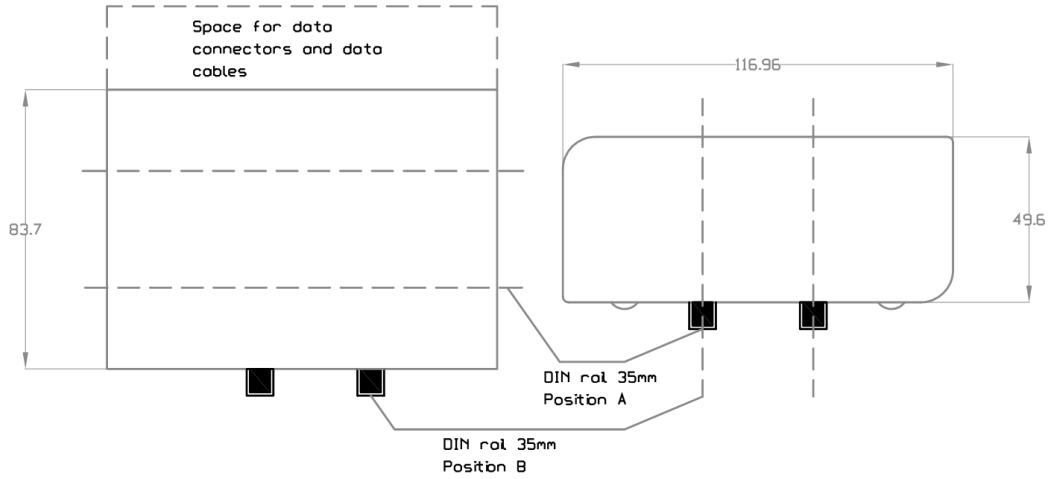

Figure 7: Basic dimensions of plastic box

5.5 Basic dimensions of metal box

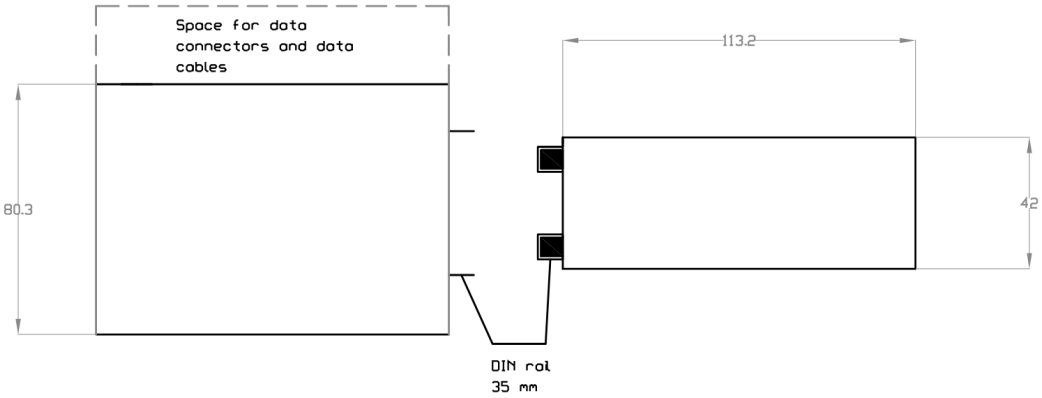

Figure 8: Basic dimensions of metal box

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5.6 Mechanical dimensions and mounting recommendations

Mounting recommendations:

- possibility to be put on a work surface,
- DIN rail with clips CKD2 (ELPAC clip SL for metal version) are included.

For the most of applications with a built-in router in a switch board it is possible to recognize two kinds of environments:

- no public and industry environment of low voltage with high interference,
- public environment of low voltage without high interference.

For both of these environments it is possible to mount router to a switch board, the following there is no need to have examination immunity or issues in connection with EMC according to EN 60439-1 ed.2:00 + A1:04.

For compliance of EN 60439-1 ed.2:00 + A1:04 specification it is necessary to observe next assembly of the router to the switch – board:

- For every cables we recommend to bind the bunch according to the following picture, we recommend for this use:
  - Length of the bunch (combination of power supply and data cables) can be maximum 1,5 m. If the length of data cables exceeds 1,5 m or in the event of, the cable leads towards the switch – board. We recommend installing over – voltage protectors (surge suppressors).
  - With data cables they mustn't carry cables with reticular tension ~ 230 V/50 Hz.
  - All signals to sensors must be twisted pairs.

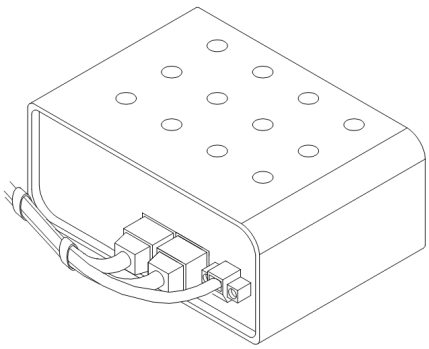

Figure 9: Cable routing

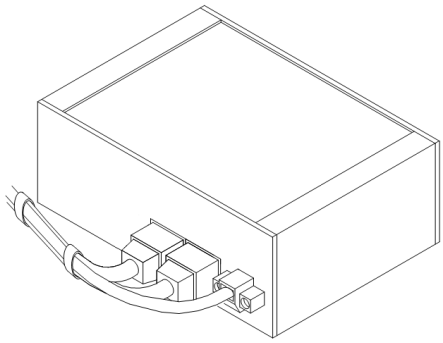

Figure 10: Cable routing for SL version

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- Sufficient space must be left before individual connectors for handling of cables,

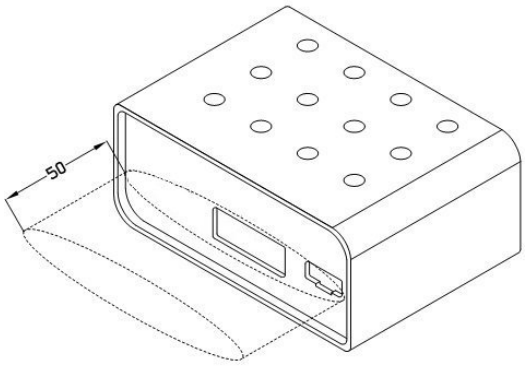

Figure 11: Space in front of connectors

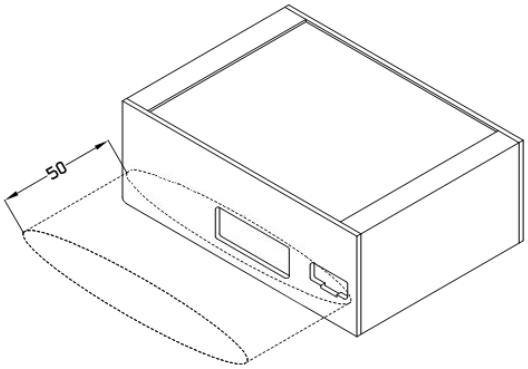

Figure 12: Space in front of connectors – SL

- For correct function of the router we recommend to use in the switch-board earth-bonding distribution frame for grounding of power supply of router, data cables and antenna.

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5.7 Removing from the DIN rail

Default position of CPD2 holder (or CKD2 holder for SL version), which is used for mounting the router on a DIN rail, is shown in the following figure:

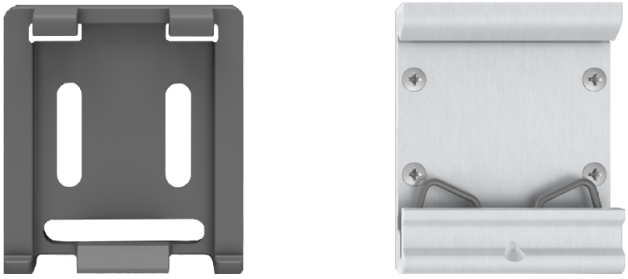

Figure 13: Default position of DIN holder

For removing from the DIN rail it is necessary to lightly push upward the router so that the top part of the CPD2 holder (or CKD2 for SL version) hitched to the DIN rail get out of this rail and then fold out the top part of the router away from the DIN rail.

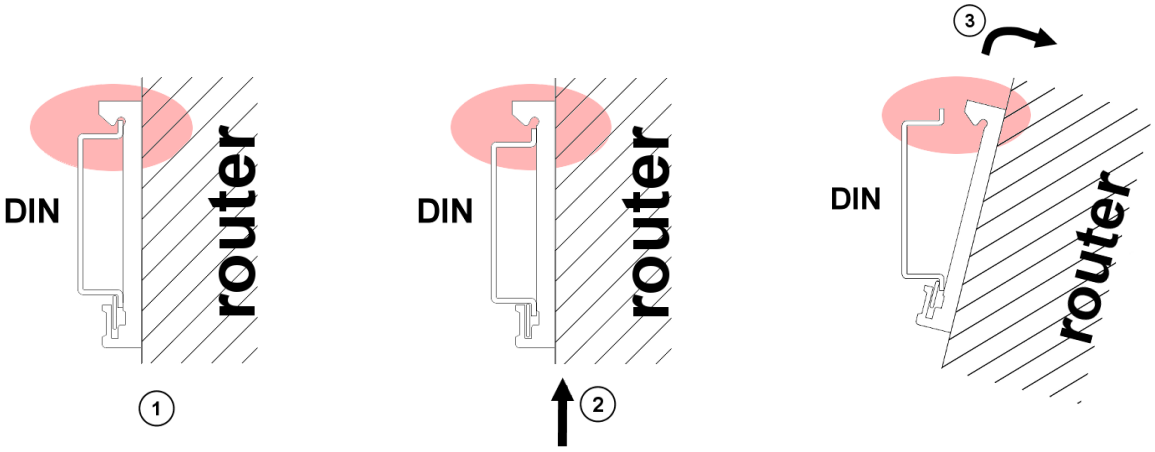

Figure 14: Removing from the DIN rail

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5.8 Description of the front panel

On the front panel is located:

Caption	Connector	Description
PWR	2-pin	Connector for the power supply adapter.
ETH0	RJ45	Connector for connection into the computer network.
ETH1	RJ45	Connector for connection into the computer network.
WIFI	R-SMA	Connector for WIFI antenna. **Only when router is equipped with a WIFI module.**

Table 3: Front panel description

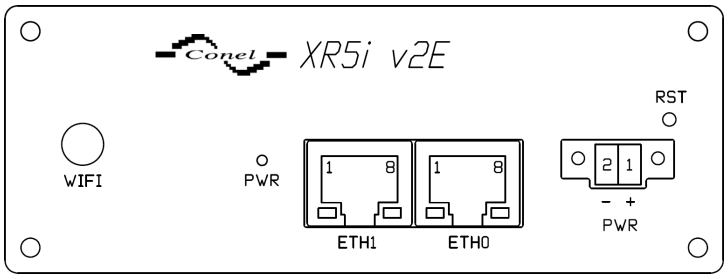

Figure 15: Front panel XR5i v2E WIFI SL

5.8.1 Status indication

About router status inform one LED indicator on the front panel and on every port are two LED indicators, which inform about port status.

Caption	Color	State	Description
PWR	Green	Blinking On Fast blinking	Router is ready Starting of the router Updating firmware
ETH	Green	On Off	Selected 100 Mbit/s Selected 10 Mbit/s
ETH	Yellow	On Blinking Off	The network cable is connected Data transmission The network cable is not connected

Table 4: Router status indication

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5.8.2 Power connector PWR

Panel socket 2-pin.

Pin number	Signal mark	Description
1	VCC(+)	Positive pole of DC supply voltage (+10 to +30 V DC)
2	GND(-)	Negative pole of DC supply voltage

Table 5: Connection of power connector

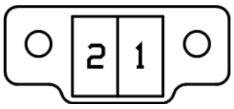

Figure 16: Power connector

Power supply for router is required between +10 V to +30 V DC supply. Protection against reversed polarity without signaling is built into the router.

The power consumption during receiving is 1,3 W. The peak power consumption during data sending is 2,5 W. However, values of consumption can be increased, if some expansion port is eqquipped. For correct operation it is necessary that the power source is able to supply a peak current of 1 A.

Connector on the power cable connects into the power connector on the router head and tightens locking screws (see figure below).

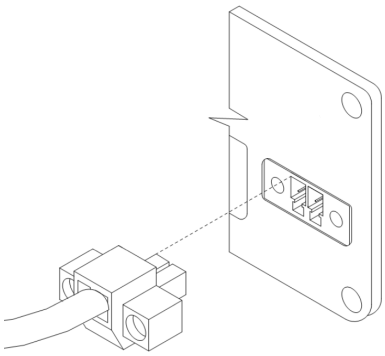

Figure 17: Connection of power supply connector

Circuit example:

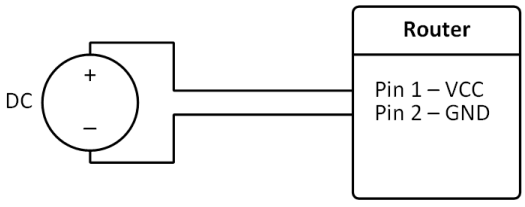

Figure 18: Connection of power supply

The positive pole VCC is marked by a red socket on the power.

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5.8.3 Ethernet port (ETH0 and ETH1)

Panel socket RJ45.

Pin	Signal mark	Description	Data flow direction
1	TXD+	Transmit Data – positive pole	Input/Output
2	TXD-	Transmit Data – negative pole	Input/Output
3	RXD+	Receive Data – positive pole	Input/Output
4	—	—	
5	—	—	
6	RXD-	Receive Data – negative pole	Input/Output
7	—	—	
8	—	—	

Table 6: Connection of Ethernet connector

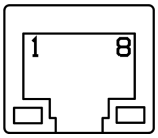

Figure 19: Ethernet connector

ATTENTION! Port ETH is not POE (Power Over Ethernet) compatible!

Ethernet cable plug into the RJ45 connector labeled as ETH (see figure below).

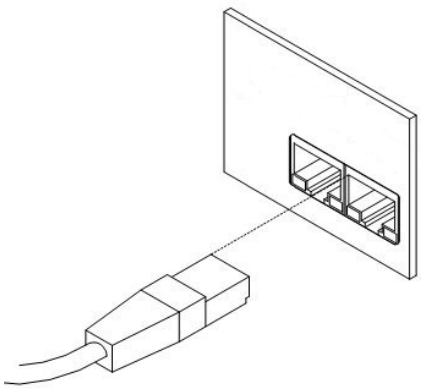

Figure 20: Connection of ethernet cable

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Example of the ETH router connection:

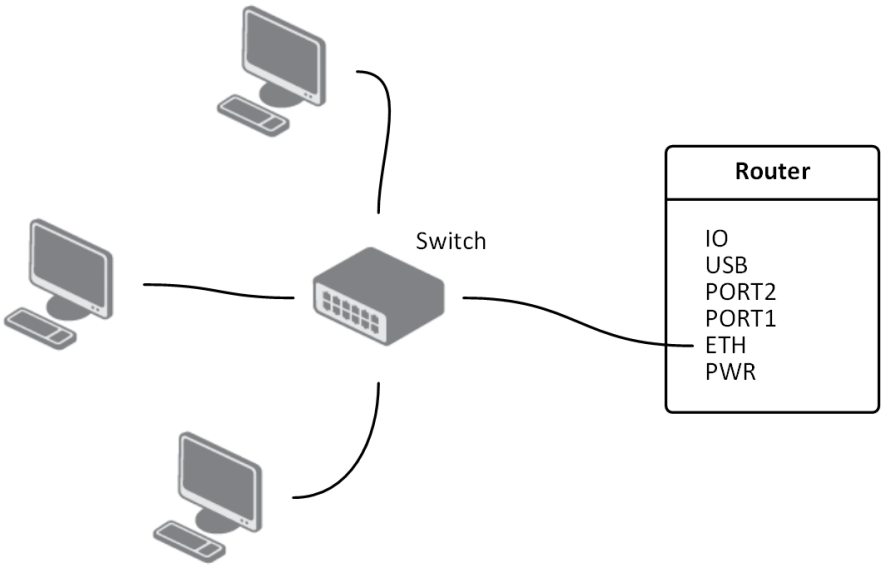

Figure 21: Example of router connection

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5.8.4 Reset

It is important to distinguish between reset and reboot the router.

Action	Router behavior	Invoking events
Reboot	Turn off and then turn on router	Disconnect and connect the power, Press the *Reboot* button in the web configuration
Reset	Restore default configuration and reboot the router	Press RST button

Table 7: Description of reset and restart router

After green LED starts to blink it is possible to restore initial settings of the router by pressing button RST on front panel. After press button RST it is restoration of default configuration and reboot (green LED will be on).

For pressing the RST button could be used a narrow screwdriver.

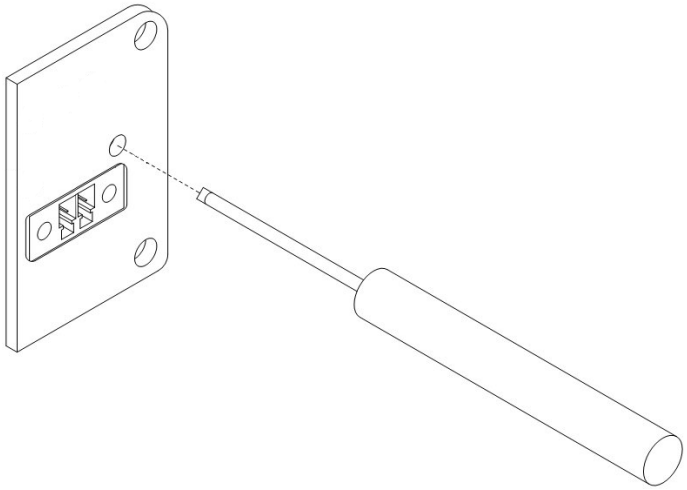

Figure 22: Router reset

We recommend to backup your router configuration (see Configuration manual), because after reset router set configuration to the initial state.

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6. First use

6.1 Connecting the router before first use

Before you give up the router, it is necessary to connect all components needed for the operation of your applications and the SIM card must be inserted (see figure below).

The router can not operate without connected power supply.

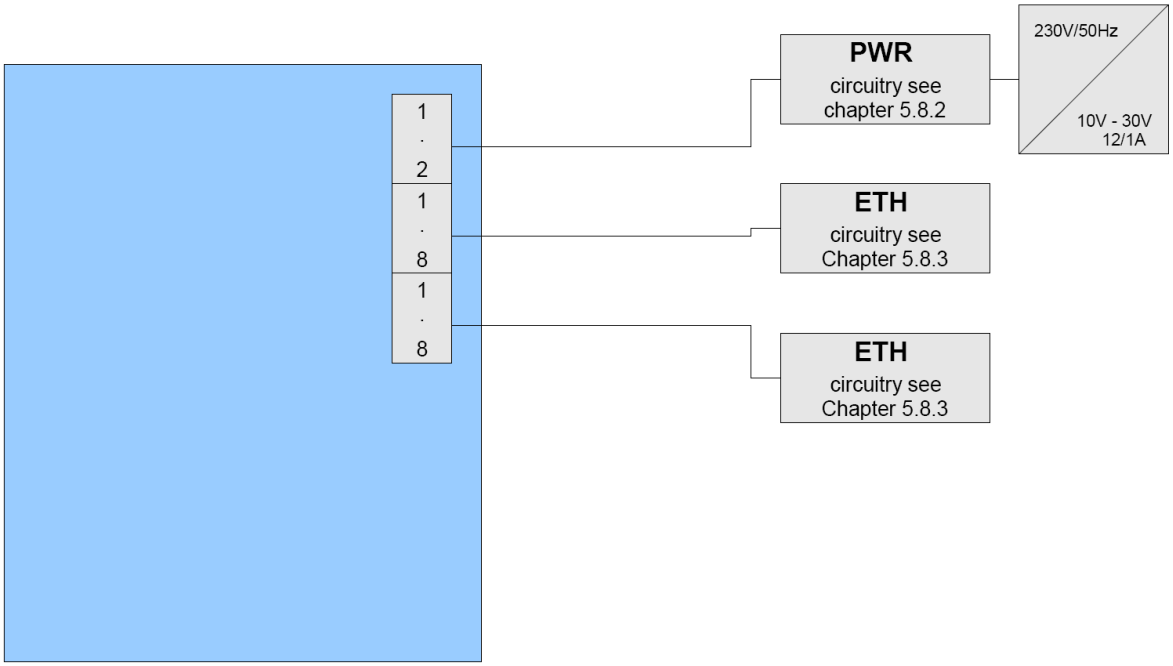

Figure 23: Router connection

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6.2 Start

The router is set up connecting the power supply to the router. The behavior of the router can be modified by means of the web or Telnet interface, which is described in the configuration manual.

The power consumption during receiving is 1,3 W. The peak power consumption during data sending is 2,5 W. However, values of consumption can be increased, if some expansion port is eqquipped. For correct operation it is necessary that the power source is able to supply a peak current of 1 A.

6.3 Configuration

6.3.1 Configuration over web browser

Monitoring of the status, configuration and administration of the router can be performed by means of the web interface, which is available after insertion of IP address of the router into the web browser. The default IP address of the router is 192.168.1.1. Configuration may be performed only by the user "root" with initial password "root".

A detailed description of the router settings via the Web interface can be found in the configuration manual.

6.3.2 Configuration over Telnet

Monitoring of status, configuration and administration of the router can be performed by means of the Telnet interface. After IP address entry to the Telnet interface it is possible to configure the router by the help of commands. The default IP address of the router is 192.168.1.1. Configuration may be performed only by the user "root" with initial password "root".

A detailed description of the router settings via the Telnet interface can be found in the configuration manual.

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7. Technical parameters

7.1 Technical parameters of router

XR5i v2		
Complies with standards		ETSI EN 301 489-1 V1.8.1, EN 60950-1:06 ed.2 + A11:09 + A1:10
Temperature range *	Function Storage	-40 °C to +75 °C -40 °C to +85 °C
Protection		IP20
Supply voltage		10 to 30 V DC
Consumption	Without communication WIFI communication Full communication	1,3 W 1,9 W to 2,5 W
Dimensions		42 x 76 x 113 mm (DIN lišta 35 mm)
Weight		XR5i v2E – 150 g XR5i v2E SL – 280 g
User interface	ETH	Ethernet (10/100 Mbit/s)

Table 8: Technical parameters of router

* If the router is equipped with WIFI module, the temp. range is reduced to -15 °C to +65 °C.

7.2 Technical parameters of processor

32b ARM mikroprocesor	
Memory	512 Mb DDR SDRAM 128 Mb FLASH 1 Mb MRAM
Interface	Serial interface RS232 Ethernet interface 10/100 Mbit/s USB 2.0 interface

Table 9: Technical parameters of processor

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8. Recommended literature

[1] Conel: **Start guide**,
[2] Conel: **Configuration manual**,
[3] Conel: **Application guide – Programmer guide**.

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9. Possible problems

Some network cards are able to be set in situation, when it is not possible to connect the router. It is possible to solve this problem in the following steps:

- hand by selection communication rates 10 MB/s in property network cards,
- connect router over switch,
- start computer only after finalizing the start of the router.

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10. FAQ

- ✍ I can't get from internet on equipment, which is connected to router and I have NAT enabled.
  - *The device's gateway has to be configured as the router.*
- ✍ Router resets itself, connection on Ethernet fails.
  - *It is necessary to use an antenna, which will be situated far from power supply.*
- ✍ I don't get on web server at NAT.
  - *The remote http access of the router has to be disabled, default server address has to be your web server and the gateway of the web server has to be the IP of router.*
- ✍ Connection fails on Ethernet or connection isn't establishing.
  - *On ethernet interface of the router it is possible to switch auto negotiation off and set a rate and duplex by hand.*
- ✍ DynDNS not function.
  - *In private APN not functional.*
  - *If the same IP address is recorded in your canonic name as dynamically assign address, it means that the operator is using NAT or firewall.*
  - *NAT is possible to verify by the help of the ping on address of your server with static IP address and by the help of the router address verify and address in ping.*
  - *Firewall is possible to verify, for example by remote access on web interface.*
  - *The operator doesn't give out address DNS servers and without DNS server's it is impossible to connect to server dyndns.org. In log system will be this message:*
    - *DynDNS daemon started*
    - *Error resolving hostname: no such file or directory*
    - *Connect to DynDNS server failed*
- ✍ IPSec tunnel is establishing but communication doesn't function.
  - *Probably it is badly set up route conditionals of connected equipment or it is bad set up GW.*
- ✍ FTP doesn't function.
  - *Router doesn't support the active FTP mode, supports the passive mode only.*

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✍ L2TP or IPSec isn't establishing.

- *Verify the reason in the log system.*

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11. Customers support

You can find current information about this product on our website:

www.conel.com

Upkeep-advices:

- The SIM-card must be handled carefully as with a credit card. Don't bend, don't scratch on this and do not expose to static electricity.
- During cleaning of the router do not use aggressive chemicals, solvents and abrasive cleaners!

Conel Company hereby declares that the router narrated in this user's guide fits all basic demands of directive 1999/5/EC (R&TTE).

Router fits values of coefficient SAR defined by association ICNIRP and values of "About protection of health before non-ionized radiation".

CE Declaration of conformity was issued and it is possible to find it on the Conel website (http://www.conel.com/download) [1] or at producer.

[1] Please, use the following login information: Username – ConelFreeDownload, Password – coneldownload.

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